NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION
WETLAND RESTORATION
(acre)
CODE 657

GENERAL SPECIFICATION

Procedures, technical details and other information listed below provide additional guidance for carrying out selected components of the named practice. This materaial is referenced from the conservation practice standard for Wetland Restoration and supplements the requirements and considerations listed therein.

Purpose

The purpose is to restore and rehabilitate wetlands which have previously been otherwise degraded, drained or altered. New Mexico has many wetlands which have been altered due to agricultural drainage along rivers, diversions, dikes, levees, degraded streams, and removal of beavers from the watershed.

Hydrology Restoration:

A permanent water supply must be available to provide for the needs of the wetland.

The hydrology of the site is defined as the rate and timing of inflow and outflow; duration, frequency, and depth of flooding, ponding or saturation.

The maximum hydrology and the overall hydraulic variability of the restored site will approximate the conditions that existed before alteration, e.g., dynamic and static water levels, soil saturation.

The standards and specifications for Dike (356) and Structure for Water Control (587) will be used as appropriate. Refer to the Engineering Field Handbook, Chapter 13, "Wetland Restoration, Enhancement, and Creation," and Chapter 6, "Structures," for additional design information. Existing drainage systems will be utilized, removed, or modified as needed to achieve the intended purpose.

Soils

Hydric soils will be used, where possible, to interpret previous wet conditions in determining the extent of the degraded wetland and to design the restoration.

Surface Drainage Removal:

Where open channels were constructed to drain the wetland, the channel will be filled with earth or controlled with a grade stabilization structure to restore the wetland hydrologic conditions. A water control structure may be required to manage water levels for wetland operation and maintenance.

Provisions will be made to store, pass or divert the flow from the 10-year or greater frequency 24-hour storm so that is does not cause erosion and offsite flooding impacts.

Where the channels serves as an outlet for upstream lands, it is necessary to

meet applicable state and local laws and regulations pertaining to flooding, surface and substrate drainage or storage.

The channel may be blocked with earth fill without a flow control device where flow duration and rate will not cause erosion and head cutting. The minimum length of a channel to be filled will be based on the hydraulic conductivity (permeability) of the soil at the site.

For channel blocks the minimum length to be filled is 50 feet for soils with an average hydraulic conductivity of less than 0.6 inches per hour, 100 feet for 0.6 to 2.0 inches per hour, and 150 feet for greater than 2.0 inches per hour.

The side slopes on channel blocks will 3:1 or flatter. All fill will be compacted to achieve the density of adjacent materials. The fill for channel blocks will be crowned a minimum of one foot above the top of the lowest existing channel bank to account for settlement and to prevent concentrated flow over the channel block.

Grade Stabilization Structure.

When the 10-year frequency 24 hour duration storm flow or base flow from snowmelt or groundwater inflow will prevent stabilizing the site due to long duration flows or high peak discharge, the channel will be filled and stabilized with a structure that meets the criteria for Grade Stabilization Structure (410).

Water Control Structure:

When it is desirable to control or manipulate the water level for operation and maintenance of the wetland at an elevation different than that caused by blocking the channel, a water control device meeting criteria of Water Control Structure (587) will be used.

Materials used for grade stabilization or water control structures will have a minimum 25 year durability in the soil, water, and climate conditions associated with the site unless site specific operation and maintenance plans and designs document rationale for shorter life materials. Fire resistant materials will be used for exposed portions of structures where vegetation will be maintained by burning.

Subsurface Drainage Removal:

In areas where subsurface drains were used to remove surface water or soil saturation, the existing system will be modified to restore the wetland hydrologic conditions. Use old drainage records, interviews, and site investigations as needed to determine the extent of the existing system. The effect of any modification to the existing subsurface drainage system on upstream landowners will be evaluated and the landowner will be notified of potential offsite impacts. This evaluation will include both surface and subsurface impacts.

Where the subsurface drain serves as an outlet for upstream properties, it will be necessary to meet applicable state and local laws and regulations pertaining to subsurface drainage and flooding. Upstream surface and subsurface drainage will not be impacted unless appropriate easements are obtained or mitigation measures are implemented.

The following may eliminate the effects of the subsurface drainage system:

a. removing a portion of the drain at the downstream edge of the site,

b. modifying the drain with a water control device, or

c. Installing nonperforated pipe through the wetland site.

The minimum length of drain to be removed is 50 feet for soils with an average hydraulic conductivity of less than 0.6 inches per hour, 100 feet for 0.6 to 2.0 inches per hour and 150 feet for greater than 2.0 inches per hour. All envelope filter material or other flow enhancing material will also be removed for the length. The trench will be filled and compacted to achieve a density equal to adjacent material.

A water control device placed on the inlet of an existing drain will limit inflow that will prevent damage to the drain downstream of the site. If the drain serves other areas, inflow will be limited to the capacity originally apportioned to the drain.

The water control structure will be attached to a non-perforated conduit that extends at least the minimum length previously specified for the length of the drain to be removed. The connections of the water control structure and the non-perforated pipe will be watertight at the head created at the maximum pool level.

Storage Volume Replacement:

Where the wetland site has been filled by sediment, land shaping, or other activities, the storage may be replaced by excavating the fill material from the site or by construction of an earth embankment.

Sediment deposition or other fill materials will only be removed to the top of the buried hydric soil. Sediment will be removed and placed on upland sites.

If the presence of hazardous waste materials in the sediment or fill is suspected, soil samples will be collected and analyzed for the presence of hazardous waste as identified by local, state, or federal authorities.

Embankments:

An earth embankment may be constructed to create a pool storage volume equal to that which existed prior to conversion of the site. Embankments with an effective height of less than 6 feet will meet the criteria for Dike (356). Embankments with an effective height of greater than 6 feet will meet the criteria for Pond (378).

Embankments meeting criteria for dikes will safely handle a 10-year frequency 24-hour storm at the dike design high water level.

Embankment material should be soils, which are stable for fill construction. Organic soils should not be used for embankment materials.

Dugout:

Dugouts and potholes will meet criteria for Wetland Wildlife Habitat Management (644).

Wetland dugouts may be used to restore previously filled wetlands and to develop wetlands. A wetland dugout is a constructed shallow depression area. Side slopes shall be shaped to a stable grade. All excavated material shall be spread on non-wetland sites, or will be hauled off-site. No spoil will be allowed in any drainage path.

Potholes may be developed or restored through blasting, excavation, or by restoring the hydrology to existing depression areas. Blasting is to be done by experienced personnel in accordance with federal, state, and local regulations.

Vegetation Restoration:

The vegetation shall be restored as close to the original natural plant community

as the restored site conditions will allow. Determination of the original plant community's species and percent composition shall be based upon reference wetlands of the type being restored.

Plantings, seeding, or other types of vegetative establishment will be comprised of native species that occur on the wetland type being restored.

Preference shall be given to native wetland plants with localized genetic material. Plant materials collected or grown from material collected within the same MLRA as the site, is considered local. Woody vegetation may need protection from beavers until established.

In soils where seed banks realistically exist, or where natural colonization of selected native species (identified from reference wetlands) will dominate within 5 years, then natural regeneration can be allowed. Specific guidelines that consider soil, seed source, and species will be developed by the states.

Adequate substrate material and site preparation necessary for proper establishment of the selected plant species shall be included in the design.

On sites which were predominantly herbaceous vegetation prior to modification and planting and/or seeding is necessary, the minimum number of native species to be established shall be based upon the number of ecological sites present. Sites restored to only one ecological site shall be established with at least two species adapted to the site. Sites with two or more ecological sites (i.e., wet meadow, shallow marsh, or slough sites, etc.) shall be established with at least one native species on each ecological site.

Herbaceous vegetation may be established by a variety of methods including: aerial seeding, topsoiling, organic mat placement, wetland sod, wetland hay, or etc., over a portion of the site and at densities and depths appropriate.

Forested wetland plantings and/or seeding will include a minimum of three tree or shrub species on each ecological site (i.e., low flat, bottom ridge sites, etc.), where appropriate. Tree (and shrub) planting will follow the criteria of Conservation Practice 612 - Tree Planting. Dormant pole planting is also a viable method for restoration of cottonwoods and willows.

A vegetative buffer zone should be established in areas surrounding the wetland. The buffer will act as a filter for sediment and debris. The buffer zone must be wide enough to adequately filter overland runoff from the surrounding uplands.

Seed planting rates and site preparation will meet the criteria of Conservation Practice 652 - Woodland Direct Seeding. Seed viability will be determined prior to planting.

Wetland Functions:

A functional assessment (Hydrogeomorphic Approach or similar method) shall be performed on the site prior to restoration.

Restoration goals and objectives shall include targeted natural wetland functions for the wetland type and the site location as determined by the functional assessment and reference site data. A post-project assessment will be performed after an adequate period to assess the success of the restoration.

Planning for vegetation:

Planning for vegetation needs to begin early in the overall wetland planning process. Species selection can be effected by many factors of the design, construction, and site.

Changes in management may meet the cooperator's objectives for restoring the wetland without implementing accelerating practices such as seeding or planting and should be considered.

Dikes, pond embankments, and other engineering structures installed in association with this practice may have non-hydric soil situations and require vegetation. Refer to Critical Area Stabilization (342) standard for vegetation considerations.

Specify required management of water and/or animals before seeding/planting is implemented.

Species in Table 1 are found in wetlands in New Mexico.

TABLE 1.

Scientific name	Common Name
Scirpus acutus	Hardstem bulrush
Scirpus validus	Softstem bulrush
Eleocharis	Spikerush
Scirpus pungens	Threesquare bulrush
Scirpus olneyi	Alkali bulrush
Polygonium sp.	Smartweeds
Carex nebrascensis	nebraska sedge
Juncus Balticus	Baltic rush
Salix species	Willows
Populus species	Cottonwoods

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. Specifications shall be recorded using approved specifications sheets, job sheets, narrative statements in the conservation plan, or other documentation. Requirements for the operation and maintenance of the practice shall be incorporated into site specifications.

OPERATION AND MAINTENANCE

The functional integrity of the restored wetland will be maintained.

Structures built to restore the wetland will be inspected each year for the life of practice. Water control structures will be inspected for wear and damage so that the designed amount of water is retained in the wetland and/or delivered to the wetland. Embankments must maintain designed water levels without leakage.

Hydrology of the designed wetland must not be altered.

Functions of the designed wetland will be evaluated and maintained for the life of the practice.

REFERENCES

Allen, J.A., 1997. "Reforestation of bottomland hardwoods and the issue of woody species diversity." Restoration Ecology, vol. 5, no. 2: 125-134.

Bazzaz, F.A., 1975. "Plant species diversity in old-field successional systems in southern Illinois." Ecology 56: 485-488.

Hammer, D.A., 1992. Creating freshwater wetlands. Lewis publishers, Inc., Chelsea, MI. 298 p.

Mitsch, J.W. and J.G. Grosselink, 1993. Wetlands, 2nd edition. Van Nostrand Reinhold, NY. 722 p.